REMARKS

The Office Action of December 12, 2002 has been received and its contents carefully noted.

The present Amendment corrects a translation error that has been discovered in the last sentence of the specification. In this sentence, "charging" should be "discharging." This correction is supported, inter alia, by the sentence at page 6 of the application, lines 5-7.

The present application discloses a hybrid drive device with a storage device that includes a switching converter. The switching converter controls the charging power to a bank of condensers with a fixed or constant output current, thereby achieving high charging efficiency. In other words, the switching converter functions as a constant-current source during charging. If the condensers were charged with a fixed-voltage power source, then theoretically half of the charging power would be lost, as explained on page 6 of the present application. However, using a fixed current source to charge the condensers results in an improved charging efficiency. When the condensers are charged by a constant current power source, the resistance loss can be very small because the internal resistance of the condensers is usually very small. Typically, a high charging efficiency of 90% can be achieved by the present invention.

The rejection of the claims for obviousness is respectfully traversed, for the reasons discussed below. The place to begin is with the new reference, Deng et al, although the Koike et al reference will also be discussed further in what follows.

Independent claim 5 recites a second converter that is "a bi-directional switching converter which is connected in series with the condenser bank and which controls the direct current for charging the condenser bank to a fixed current." Independent claim 9 contains a similar recitation. In contrast, the Deng et al reference (which will hereafter be called simply "Deng") **does not** disclose that Deng's power converter 14 provides a fixed or constant current output during charging. The reference only discloses that the current output from Deng's power converter 14 to his battery is limited, not to exceed a value $I_{bus\_lim.}$ Limiting the charging current has the result of limiting the voltage at Deng's power converter 14. Thus, an overvoltage within Deng's power converter 14 is effectively

prevented during charging; while regeneration energy is allowed to be captured.

Turning now to Koike et al (which will hereafter be called simply "Koike"), the Office Action asserts that this reference discloses "monitoring a terminal voltage of the corresponding condenser cell (17), and conducting a direct current so as to bypass the corresponding condenser cell (17) if the terminal voltage of the corresponding condenser cell (17) exceeds a fixed voltage (*according to GB 2,319,407, which is a translation of the Japanese document*). It is unfortunate that the Office Action does not identify exactly **where**, according to the British patent, Koike says that his monitors 19 conduct a direct current so as to bypass the corresponding condenser cell. Applicant's attorney has not been able to locate any such teaching in the reference.

The fact of the matter is that the function disclosed by Koike for his parallel monitors 19 is to detect the voltage across his cells and generate a red or green light, depending on whether the voltage is below a first preset value or above a second preset value (see the passage at page 14 of the reference, lines 17 to page 15, line 7). In contrast, parallel monitors of claim 5 conduct "a direct current so as to bypass the corresponding condenser cell if the terminal voltage of the corresponding condenser cell exceeds a fixed voltage," and independent claim 9 contains a similar recitation. There is nothing in the reference to suggest that Koike's monitors 19 have anything to do with bypassing his cells.

Since the remaining claims depend from the independent claims discussed above and recite additional limitations, they are patentable along with their independent claims and need not be further discussed. Nevertheless, dependent claims 6 and 10 will now be briefly mentioned.

Dependent claim 6 recites that "the second converter…further controls a discharge voltage of the condenser bank to a fixed voltage," and claim 10 is similar. However, the Deng reference **does not mention anything** about the operation of his power converter 14 and his motor controller during discharging. Certainly there is no hint in the reference of controlling the discharge voltage to a fixed or constant value, irrespective of the voltage of the condenser bank (which varies depending upon the stored energy). Since the switching converter has the function of outputting a fixed discharge voltage, it has a wide operating

range corresponding to the condenser characteristics and can be used even if the voltage across the condensers has been reduced to a low level.

When claim 6 is considered together with claim 5 and claim 10 is considered together with claim 9, it will be seen that the switching converter provides a fixed current when the condenser bank is being charged and a fixed voltage when it is being discharged. It is respectfully submitted that this is not suggested by the references.

For the foregoing reasons, it is respectfully submitted that the application is now in condition for allowance. Reconsideration of the application is therefore respectfully requested.

Respectfully submitted,

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ATTACHMENT A -- REVISIONS TO THE SPECIFICATION

This attachment includes paragraphs from the original specification, with the paragraphs that are being rewritten in this Amendment being marked up to show the changes in the rewritten paragraphs.

Please replace the paragraph bridging pages 6-7, with the following rewritten paragraph:

The ratio Ec/Ep of the charging power Ep and the stored power Ec, that is to say, the charging ratio is 50% from Equations (1) and (2). Since the condenser is not a fixed voltage device such as a secondary battery, when charged by a fixed voltage, half the charging current is lost as heat due to resistance components between the condenser and the battery. In contrast, the switching [condenser] converter 23 in the present embodiment controls the charging current to the condenser 21 to a fixed current output. As a result, even when charging is performed with a large current generated by the electrical motor 10 during regeneration of braking energy, a high charging efficiency of greater than or equal to 90% is obtained and it is possible to increase fuel economy performance by regeneration of braking energy.

Please replace the paragraph on page 8, lines 10-17, with the following rewritten paragraph:

Since the cycle life concerning the charging/discharging of the condenser 21 is longer than a general vehicle cycle life, it is almost never necessary to replace the condenser 21 during the life of the vehicle. That is to say, the condenser 21 entails much lower running costs for the drive device in comparison to a secondary battery. When the input voltage range of the inverter 11 is wide, it is possible to use a switching converter without fixed voltage output characteristics with respect to [charging] discharging.